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(Puławy).

**Przyczynki do biologji *Laelia coenosa* Hb.
(*Lepidoptera, Lymantriidae*).**

(Doniesienie tymczasowe).

**On the Life-history of *Laelia coenosa* Hb.
(*Lepidoptera, Lymantriidae*).**

(Preliminary note).

[Pl. X — XI].

Laelia coenosa Hb.¹⁾ (*Lepidoptera, Lymantriidae*) was recorded first from Poland in summer, 1930. Larvae of *Laelia coenosa* damaged uncultivated meadows (*Caricetum*) near Tomaszgród in the district of Sarny. According to informations obtained from Prof. Dr. L. REH (Hamburg) and from Prof. Dr. H. MORSTATT (Berlin-Dahlem), the species was not recorded hitherto as a pest. According to SPULER it is known from many countries: „stellenweise in England, Nordfrankreich, Norddeutschland (nördlich bis Berlin), im ganzen ungarischen Tiefland, der Bukowina und Bulgarien, ausserdem in Katalonien (in Ostasien bis Japan), im August”. *Laelia coenosa* Hb. does not seem to be rare: it is mentioned even in the publications of BAU (1) and RÖSSLER (13) where only common species are quoted. In the key of FILIPJEV (7) it is given as a typical representative of the genus *Laelia* STPH.; it is known also from Russia.

On July 9, 1930, the author found numerous yellow and cream coloured hairy caterpillars feeding on *Carex* sp. and *Phrag-*

¹⁾ The determination was kindly verified by Mr. A. STÖKL, Lwów, and by Dr. J. KREMKY, Warsaw.

mites communis TRIN. at the peaty meadows of Rostoki in the vicinity of Tomaszgród. The average number of larvae on 1 m² was 45. 40 per cent. of the larvae began to spin cocoons at that time. The cocoons were placed always at the lower part of the stems, often several (2 — 5) cocoons touching each other on a stem. The flora of the mentioned meadows consists chiefly of different species of *Carex*: *C. limosa* L., *C. lasiocarpa* EHRR., *C. chondrorrhiza* EHRR., *C. goodenoughii* GAY., *C. pseudocyperus* L. The tufts of reed-grasses grow on a dense *Sphagnum*-cover on marsh. Among the tufts rise: *Menyanthes trifoliata* L., *Equisetum limosum* L., *Ranunculus lingua* L., *Scutellaria galericulata* L., *Phragmites communis* TRIN., *Calla palustris* L., *Agrostis* sp.

The larvae and their cocoons were collected and brought to the laboratory of the Department of Plant Protection of the Experiment Station for Peatbog Culture near Sarny. The moths emerged in the laboratory between July 23 and 29. At first emerged the males only, some days later the females. The females deposited their eggs in straight rows on the leaves of *Carex* [Pl. X, fig. 3] and on the walls of the cages [Pl. X, fig. 4]. On August 8th the eggs deposited in the laboratory began to hatch and the young larvae fed on the leaves of *Carex*. After one month they ceased to feed, but survived till February. The eggs in natural conditions, at Rostoki, did not hatch in autumn. The eggs collected in field on August 9th, 1930, were kept till spring, 1931, when the author found them all infested with an egg-parasite.

In May, 1931, observations and collecting of early stages of the larvae was impossible as the whole meadow was under high water till June. A view of the meadow in May is shown on pl. X, fig. 1 and 2. In June the author collected larvae of the penultimate instar on the same meadow. Later Prof. Dr. D. SZYM-KIEWICZ has found the larvae of *Laelia coenosa* HB. on a small forestal peatbog (*Eriophoretum*) near the buildings of the Experiment Station for Peatbog Culture. The flora of the *Eriophoretum* in question is composed of tufts of *Eriophorum vaginatum* L. on a *Sphagnum*-cover, among them *Carex lasiocarpa* EHRR., young pines of sick aspect, on the borders *Vaccinium uliginosum* L., *V. myrtillus* L., *V. vitis-idaea* L., *Andromeda polifolia* L., *Carex goodenoughii* GAY.

The author studied the larvae on many food-plants in the

experimental field on cultivated peatbog and in the laboratory and obtained the second generation of larvae which died after few moults.

The moth.

The specific name of the insect is derived from the dirty-white colour of the female [Pl. X, fig. 3]. The male [Pl. XI, fig. 6] is light brown with 5 brown punctures on the margins of the fore-wings. Males and females measure 15 mm in length. Wing expanse 35 — 45 mm. Males slightly smaller than females. Head, thorax and abdomen brown, densely covered with long white hairs and scales. Eyes black. Shaft of antennae black, covered dorsally with white scales. Antennae of males bipectinate, of females biserrate. Pectinations and dentations black. Legs brown covered with yellow hairs. The intermediate tibiae bear a pair of spurs at the tip, the hind tibiae have two pairs of spurs: one pair at the tip and the second below the middle. The fore tibiae of males bear epiphyses longer than the tibia and curved at the tip.

The moths began to emerge in the laboratory on July 12th, in the cages on cultivated peatbog on July 21st, on *Eriophoretum* in the forest on July 31st. During her presence at Rostoki on July 26th, 1931, the author was able to observe many moths flying in the field. The moths began to fly before sunset.

Mating and oviposition.

Mating usually takes place at night. The heads of the moths in copula point to opposite directions, and the insects remain often in that position during the day. Mating pairs were observed at Rostoki on the plants, in the cages on the walls. After the mating the female lays the eggs in rows on the stems and leaves of plants. In the laboratory oviposition takes place on wooden walls, wire-nets and glass of the cages as well as on the plants. One pair in the laboratory was separately examined: mating occurred once and then the female deposited the eggs during three days; the total number of eggs was 224. Females kept without males died with their abdomina full of eggs. One female was observed to deposit eggs without previous mating but these dried after some weeks.

The egg.

The egg is sphaerical with flattened upper side. The colour is white with an uncomplete grey ring and a grey spot in the middle of the flattened side [Pl. X, fig. 3 and 4]. The number of eggs in one row is usually about 10, but rows are met of more than 20 eggs. Among the eggs deposited in the laboratory the longest row contained 30 eggs, on *Carex* at Rostoki — 29, in the cage on the cultivated peatbog — 35. Hatching began in the laboratory in 1930 13 days after oviposition, in 1931 — 10 days. The eggs which hatched in the cages were deposited only by females emerged of pupae, obtained from larvae reared up in the laboratory. In natural conditions one generation occurs as a rule. The eggs hibernate according to SPULER (16), SEITZ (14), LAMPERT (12), ECKSTEIN (6), BERGE (2). At Rostoki the eggs remain in winter under snow and ice, in autumn and spring — under water. The time of their hatching in field is unknown; but the eggs collected at Rostoki on July 26th, 1931, and the eggs deposited in the cages by the females collected there hatched in the laboratory on August 5th, 1931. Some eggs collected at Rostoki did not hatch, being infested by an egg-parasite.

The larva.

Only the last and penultimate larval instar was observed in field conditions. The earlier stages were obtained in the laboratory and in the cages on cultivated peatbog. The young larvae hatched in August fed normally till September, when the night colds began. At that time the larvae ceased to grow, although they moulted several times more.

First-instar larva. The newly hatched larva is 3 — 3,5 mm long. Head brownish, body uniformly grey. On each segment 8 tubercles with long hairs. Prothorax bearing on each side a tuft of long black hairs, a similar tuft is found on the back of the eighth and ninth abdominal segments. 5 pairs of abdominal legs are present. The first stage larvae eat probably their egg-shells during the first two days, as at this time they do not feed on *Carex*-leaves and the egg-shells partially disappear [Pl. X, fig. 4]. After two days they begin to feed on cut *Carex*-leaves biting out semi-lunar notches at the sides of the leaves [Pl. XI, fig. 7]. They grow

quickly and reach about twice their original size in 5 — 10 days, when they moult. Before the moulting each larva constructs a small flat web on leaves, cork, glass or walls of the cage. After moulting the second stage larva does not feed during one day.

Second-instar larva. The newly moulted larva is 5 — 6 mm long. Head black, body grey with black dorsal band and black side bands. The bands are composed of oblique black lines around the tubercles. On the 6th and 7th abdominal segments there are small button-like glands on the middle of the back (comp. the glands of the full-grown larva on pl. XI, fig. 6). On the tubercles on each segment arise clusters of hairs. On the side tubercles arise white hairs, on the dorsal ones longer black hairs and shorter white ones.

The second stage larvae feed in the same manner as do the first stage larvae. After some days they moult on small flat webs.

Third-instar larva. The larvae of this stage reach 10 mm in length and 1 mm of width. The pattern of the body does not differ from that of the second-stage larva. Only a few larvae reached this stage, the greater part ceased to grow.

Fourth-instar larva. A pair of larvae moulted once more and showed after moulting a small brush of very short hairs on the first abdominal segment. The brush is orange in colour. The size of the larva was not increased. In the cage on the cultivated peatbog only one larva reached this stage.

Fifth-instar larva. Only one larva in the glass moulted once more. It showed then small brushes on the two first abdominal segments. The first brush was larger than the second. The size of the larva was not larger than in the former stage. The colour of the brushes was orange. The causes of the stopping of growth of the larvae are probably the unfavorable weather conditions in September: cold nights and heavy rainfalls. All the growing larvae ceased to feed and to grow and they died.

Larvae observed in the field. Penultimate instar larva. The youngest larvae were observed in field conditions on June 9th, 1931, at Rostoki. The appearance of the larvae was the same as of those of the fifth stage, which were described above. The larvae with two small orange or yellow brushes measured 16 — 20 mm. Body cream or yellow with black longitudinal bands. The hairs mostly white, some of them black, The larvae

feed commonly on different species of *Carex*, beginning to eat from the tip of the leaf and devouring it including the middle rip. The larvae moult on the leaves.

Last instar larva. Newly moulted larva about 25 mm long. All four brushes of the same length, about 4 mm. The appearance as in the former stage, but all hairs are white or yellow except the black pencils on the prothorax and on the 8th and 9th abdominal segments. Full-grown larva before the pupation measures 35 — 40 mm in length and 5 — 6 mm in width. The usual colour of the body of the larvae is cream with the dorsal and lateral longitudinal black bands. Some specimens are particularly pale owing to very inconspicuous bands. Some larvae have on the contrary very wide bands, what gives them a dark aspect. The brushes are cream or yellow, as the other hairs, or more intensely yellow. The tubercles of the larvae are in all stages of the same colour as the body: grey in the young stages, cream or yellow in later ones. The reddish-yellow tubercles described by LAMPERT (12), SPULER (16) and shown by these authors on the corresponding illustrations as well as by SEITZ (14), RÖSSLER (13), BLASCHKE (3), ECKSTEIN (6, on the plate, however, the larva is shown with uniformly coloured body) — were observed neither in the field nor in the laboratory. BERGE (2) does not mention any difference in the colour of the tubercles.

Some of the larvae coloured as the full-grown ones, with all normal four brushes, moulted once more before pupation. Field observations on *Eriophoretum* showed, that the larvae are very active, they wandered about 1 m daily, although they had enough food all around.

The pupa.

The pupa is 16 — 20 mm long and 6 — 7 mm wide at the base of the abdomen. Shining brown, covered with short silky white or yellow hairs; it is included in a cocoon, which is spined by the larva with addition of the body hairs. Accordingly the cocoons are cream or yellow. The cocoon is usually attached longitudinally to the stems of plants, frequently several cocoons touching each other [Pl. X, fig. 3, 5, pl. XI, fig. 6]. In field conditions cocoons are mostly observed on *Equisetum limosum* L. The

larva undergoes pupation in the cocoon two days after having spun it. Two or three weeks later the adults emerge. In the laboratory pupation takes place earlier than in the field.

Food plants.

According to the literature quoted and the author's own observations the larvae of *Laelia coenosa* Hb. fed on Monocotyledonous plants. KALTENBACH (11) gives as their food plants *Carex acuta* L., *C. riparia* CURT., *Glyceria* R., *Festuca* L., *Sparganium* L., SPULER (16) — *Carex acuta* L., *Festuca* L., *Phragmites* TRIN., *Cladium* R.; LAMPERT (12) — *Phragmites* TRIN. and *Gramineae*; BLASCHKE (3) — *Carex* L. and *Festuca* L.; RÖSSLER (13) and FILIPJEV (7) — *Gramineae*.

Field observations and feeding experiments have been made to determine the favoured plants of *Laelia coenosa* Hb. for records of its economical importance.

In the field the larvae are observed feeding on different species of *Carex* L., especially on *C. lasiocarpa* EHRH., *C. limosa* K., *C. chordorrhiza* EHRH., *C. pseudocyperus* L., also on *Agrostis* sp., *Phragmites communis* TRIN., rarely on *Equisetum limosum* L. and *Eriophorum vaginatum* L.

In the feeding experiments with the larvae of the penultimate and last instar the favourable plants were: *Carex pseudocyperus* L., *Luzula silvatica* (HUDS.) GAUD., *Carex lasiocarpa* EHRH., *Molinia coerulea* MNCH., *Festuca rubra* L., *Agrostis alba* L. Partially favourable: *Carex goodenoughii* GAY., *Phalaris arundinacea* L., *Calamagrostis epigeios* (L.) RTH., *Beckmannia eruciformis* HOST. Nonfavourable: *Poa palustris* L., *Phleum pratense* L., *Alopecurus pratensis* L. The young larvae hatched in the laboratory feed on *Carex pseudocyperus* L. and *Luzula silvatica* (HUDS.) GAUD.; they avoid *Molinia coerulea* MNCH., *Agrostis alba* L., *Phragmites communis* TRIN., *Glyceria aquatica* WAHLB.

The data from the literature, kindly given me by Prof. Dr. L. REH, Hamburg, show, that the larvae of the genus *Laelia* STPH. favour Monocotyledonous plants. *Laelia suffusa* WLK. (*subrufa* SN.) and *L. adara* MOORE are known as pests of sugarcane (5, 8, 10, 17). GATER and YUSOPE (8) describing the biology of *Laelia suffusa* WLK. suggest the presence of its larvae on wild

grasses at the time of absence of rice, and their coming over from these to the rice fields. The biology of that species resembles very much that of *Laelia coenosa* Hb. SORAUER (15) mentions the species *L. costalis* MARS. of Formosa as a sugar-cane pest. Only once is a *Laelia* sp. mentioned as a pest of Papilionaceae: JARVIS (9) notes it among the pests of peanuts (*Arachis hypogea*).

Enemies.

The eggs of *Laelia coenosa* Hb. have a Hymenopterous parasite which infests many eggs in the field.

The larvae are infested by two species of *Tachinidae* which emerged from the pupae.

Besides these parasites the larvae have a predacious enemy: the ants. On the experimental field on the cultivated peatbog ants devoured the larvae on the plants and the pupae from their cocoons. The absence of ants on marshy meadows is probably one of the conditions of a so numerous appearance of *Laelia coenosa* at Rostoki and other uncultivated peatbogs, which are covered by water during the greater part of the year. The second condition which is probably favourable for the numerous occurrence of the larvae at that place may be the absence of shrubs on which insectivorous birds build their nests. On the forestal peatbog near the Experiment Station for Peatbog Culture the author found on June 26th, 1931, 62 larvae of *Laelia coenosa*, on July 4th — 50, on July 11th — 8 larvae, 7 cocoons, on July 31st — 2 and 6 cocoons. The decrease of the number of specimens the author considers as a result of the presence of dying pines on *Eriophoretum* and the presence of birds. That supposition was confirmed by openings in the cocoons and the disappearance of the enclosed pupae, what was observed by the author at the same place.

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EXPLANATION OF PLATES.

- Pl. X, Fig. 1 and 2. Rostoki in May, 1931.
 „ „ 3. Female, cocoons, and eggs of *Laelia coenosa* Hb. in the laboratory.
 „ „ 4. Newly hatching larvae, eggs and cocoon in the cage.
 „ „ 5. Eggs, female and cocoons on plants at Rostoki, August, 1930.
 Pl. XI, Fig. 6. Male, larvae and cocoons.
 „ „ 7. First instar larvae and their injuries on leaves of reed grass.

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STRESZCZENIE.

Praca niniejsza zawiera opis różnych stadiów rozwoju *Laelia coenosa* Hb., gatunku nowego dla fauny polskiej, notowanego po raz pierwszy w roku 1930 (4). W ciągu dwuletnich spostrzeżeń nad biologją *L. coenosa* nie stwierdzono czerwono- i żółtych bro-

dawek u gąsienicy, podawanych przez innych autorów (LAMPERT, SPULER, SEITZ, RÖSSLER, BLASCHKE, ECKSTEIN). Brodawki (8 na każdym segmencie) były zabarwione tak samo, jak reszta ciała gąsienicy; podobnie opisuje ją BERGE, podając zgodną z tem ilustrację.

W hodowli laboratoryjnej i w domkach na torfowisku uprawnem Czemerne pod Sarnami wylęgło się z jajeczek drugie pokolenie w sierpniu. Według danych w literaturze *L. coenosa* Hb. ma tylko jedno pokolenie w roku, zimuje w postaci jajeczek. W miejscu masowego występowania tego gatunku, na bagnie Rostoki nad rzeką Lwą w okolicy Tomaszgrodu (pow. Sarny) teren jest pokryty wodą od jesieni do maja — czerwca i dostęp wówczas jest niemożliwy, wobec czego wyląg, ani pierwsze stadja rozwoju gąsienic nie mogły być obserwowane. W okresie możliwym do wejścia na bagno występowały gąsienice w przedostatnim stadium.

Laelia coenosa Hb. nie była dotychczas nigdzie znaną jako szkodnik. Na Rostokach żer gąsienic uniemożliwił koszenie łąki w roku 1929 i 1930. W roku 1931 pojaw był mniej liczny, prawdopodobnie wskutek dwukrotnego wylewu rzeki Lwy.

Doświadczenia z żywieniem gąsienic w pracowni i na polu doświadczałnem na torfowisku uprawnem Czemerne pod Sarnami wykazały, że z traw uprawnych najodpowiedniejszymi do żeru są: *Agrostis alba* L. i *Festuca rubra* L., niechętnie spożywane *Beckmannia eruciformis* Host. i *Phalaris arundinacea* L., a zupełnie nieodpowiednie: *Poa palustris* L., *Phleum pratense* L., *Alopecurus pratensis* L. Najchętniej są zjadane turzyce w warunkach naturalnych i w hodowli. Gąsienice pierwszego stadium w hodowli jadły wyłącznie turzyce oraz *Luzula silvatica* (Huds.) GAUD.

Rodzaj *Laelia* STPH. znany jest w krajach podzwrotnikowych jako szkodnik trzciny cukrowej i ryżu. Tylko jeden gatunek *Laelia* sp. (9) był wymieniony jako szkodnik *Arachis hypogea*.

Jajeczka *Laelia coenosa* Hb. bywają porażane przez pewną błonkówkę. W gąsienicach dość rzadko pasorzytują *Tachinidae*. Mrówki zabijały gąsienice i poczwarki w hodowli na polu doświadczalnem. Ptaki nie dopuszczają do pojawu masowego *Laelia coenosa* Hb. na bagienkach śródlęśnych.

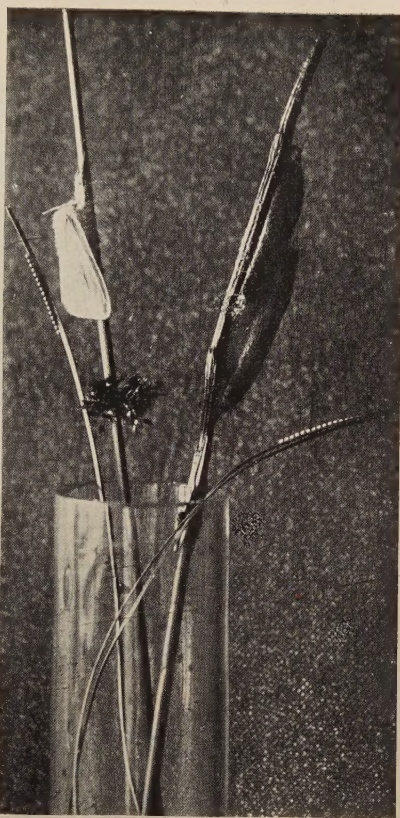
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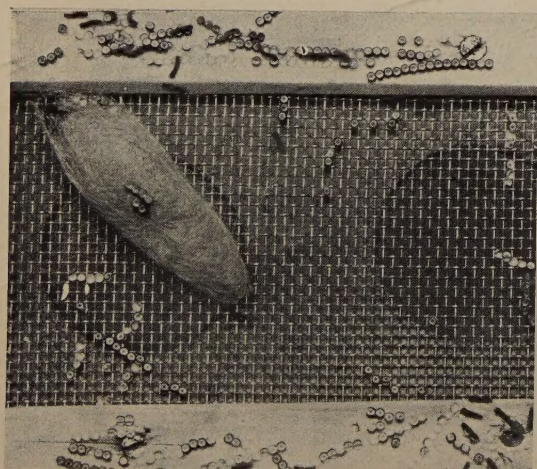
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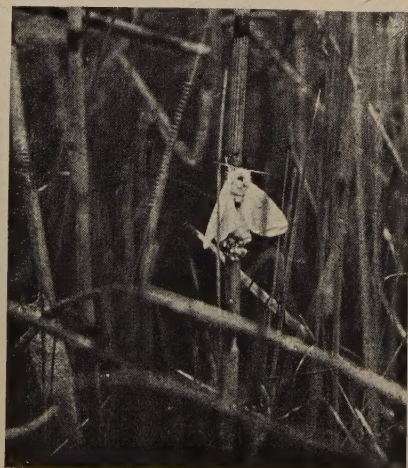
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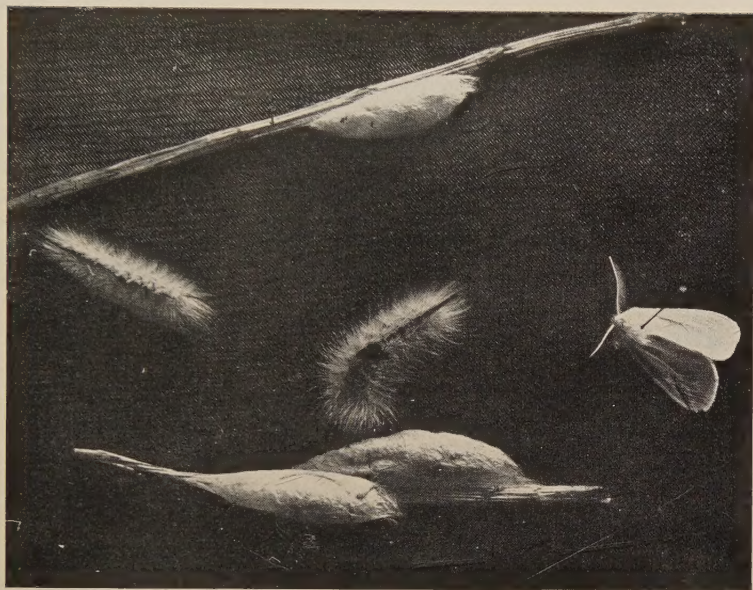


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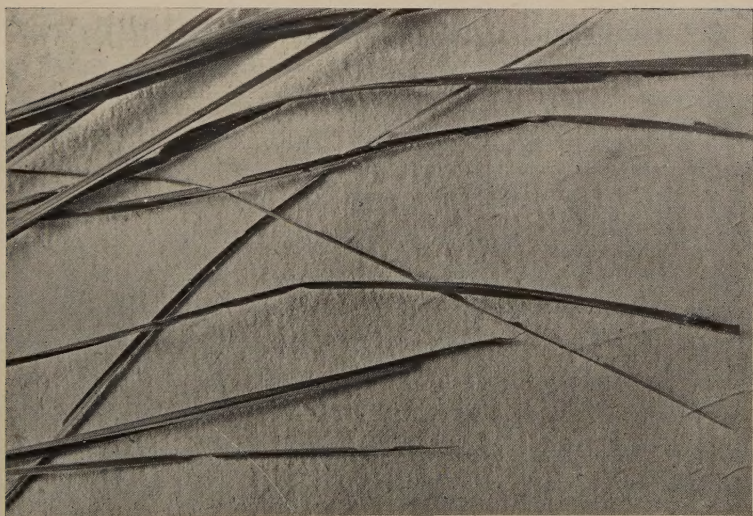


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